Do PCAOB Inspections Improve the Quality of Internal Control Audits?

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ABSTRACT

We investigate whether PCAOB inspections affect the quality of internal control audits. Our research design improves on prior studies by exploiting both cross-sectional and time-series variation in the content of PCAOB inspection reports, while also controlling for audit firm and year fixed effects, effectively achieving a difference-in-differences research design. We find that when PCAOB inspectors report higher rates of deficiencies in internal control audits, auditors respond by increasing the issuance of adverse internal control opinions. We also find that auditors issue more adverse internal control opinions to clients with concurrent misstatements, who thus genuinely warrant adverse opinions. We further find that higher inspection deficiency rates lead to higher audit fees, consistent with PCAOB inspections prompting auditors to undertake costly remediation efforts. Taken together, our results are consistent with the PCAOB inspections improving the quality of internal control audits by prompting auditors to remediate deficiencies in their audits of internal controls.

JEL Codes: G38, K23, M42, M48
Keywords: auditing, audit opinions, internal controls, regulation, PCAOB, SEC, SOX

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1. Introduction

The Sarbanes-Oxley Act (SOX) established the Public Company Accounting Oversight Board (PCAOB) to provide oversight of public-company audits. Audit firm inspections are the PCAOB's core function and the primary tool given by Congress to enable the PCAOB to perform its oversight duties (PCAOB [2005]). The auditing profession, however, is harshly critical of the inspection program, claiming that it is largely ineffective (e.g., Johnson et al. [2015]). Further, the academic literature generally finds little evidence that inspections improve the quality of US audits. We investigate whether the PCAOB inspections improve the quality of internal control audits, a potential consequence of the inspection process not previously examined. Our research design improves on prior studies by exploiting both cross-sectional and time-series variation in the contents of PCAOB inspection reports, while controlling for audit firm and year fixed effects. This specification resembles a difference-in-differences estimation with a continuous treatment (e.g., Carpenter and Dobkin, 2011).

Internal controls over financial reporting are critical in assuring high financial reporting quality, and auditors typically rely on clients' internal controls when auditing their financial statements. Recognizing the fundamental importance of internal controls, Section 404 of SOX requires the independent audit of internal controls for all public companies with a public float exceeding $75 million (referred to as "accelerated filers"). We study a time period when the PCAOB increased its scrutiny of internal control audits in response to the SEC's concerns of a widespread decline in the quality of internal control audits. Specifically,

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a downward trend in the frequency of adverse internal control opinions during 2005-2009 prompted the SEC to speculate that auditors were systematically failing to identify and report material internal control weaknesses (SEC [2009]). These concerns were heightened by a concurrent upward trend in the issuance of clean internal control opinions to companies that materially misstated their financial reports, and thus should have received adverse opinions (Rice and Weber [2012]). The PCAOB responded in 2010 by directing its inspectors to put increased emphasis on assessing whether audit firms were obtaining sufficient evidence to support their internal control opinions. The purpose of our study is to test whether the PCAOB's increased inspection efforts were successful in improving the quality of internal control audits.

Despite the PCAOB's increased efforts, there are several reasons why inspections may not improve audit quality. In interviews, auditing professionals assert that inspector-identified deficiencies typically capture differences in professional judgment, rather than systematic audit failures; and argue that PCAOB inspectors lack the incentives and technical expertise to identify deficiencies that are likely to improve audit quality (Dowling, Knechel and Moroney [2015], Glover, Taylor and Wu [2015], Johnson et al. [2015]).[1] Another impediment to the effectiveness of the PCAOB inspections is that the inspected engagements are not randomly chosen. If the identified deficiencies are unrepresentative, their remediation is unlikely to improve the firm-wide quality of internal control audits. In addition, audit firms may resist engaging in costly remediation because it is likely to increase audit fees and the issuance of adverse internal control opinions, both of which increase the risk of auditor dismissal (Ettredge et al. [2011], Newton et al. [2016], Johnson et al. [2015]). The inability of the inspections to improve audit quality is also consistent with prior research finding little

[1] The PCAOB disagrees with assertions that inspector-identified deficiencies result from differences in professional judgment. PCAOB [2012a] states: "The PCAOB bases deficiency findings only on failures to obtain sufficient audit evidence, not on disagreements when reasonable judgments appear to have been made about such matters."

evidence that adverse inspection reports trigger auditor switching among US clients (Johnson et al. [2015], Lennox and Pittman [2010]).[2]

If the PCAOB's increased scrutiny successfully identifies systematic deficiencies in internal control audits, audit firms should have strong incentives to remediate the deficiencies in their auditing procedures. The PCAOB can impose tough penalties on errant audit firms, and critical inspection reports harm auditors' career prospects (Johnson et al. [2015]). If audit firms are successful in remediating the deficiencies identified in PCAOB inspections, it should lead to firm-wide improvements in their ability to identify material internal control weaknesses. Since auditors are required to issue adverse opinions to clients with material internal control weaknesses, this should lead to a firm-wide increase in the issuance of adverse internal control opinions. Thus, if the PCAOB's increased scrutiny of internal control audits is successful, we hypothesize that audit firms will respond to the audit deficiencies by increasing the issuance of adverse internal control opinions to their clients.

We begin by documenting evidence supporting the SEC's assertion that the frequency of adverse internal control opinions declined during the period 2005-2009, and that this was accompanied by an upward trend in auditors issuing clean internal control opinions to companies with concurrent material misstatements (as revealed by subsequent restatements). Further, we document an increase in inspector-identified deficiencies in internal control audits during 2010-2013, consistent with the PCAOB's assertion that its inspectors began to intensify their focus on internal control audits beginning in 2010. We note, however, that our hypothesis does not *assume* that changes in audit quality explain these univariate time trends, as suggested by the SEC and PCAOB. Indeed, they could be explained by several other factors. For example, managers may have systematically failed to update and adapt their

[2] While there is little research that finds the PCAOB inspections, *per se*, improve audit quality, several studies find evidence of improved audit quality following the passage of SOX (DeFond and Zhang, 2014). For example, DeFond and Lennox (2011) find that SOX improved audit quality by motivating small low quality audit firms to exit the SEC market.

internal control systems in response to changes in the macro-economic environment, and/or new entrants and exits in the market could have changed the risk profile of accelerated filers. Because a variety of factors could influence the time trends in adverse internal control opinions as well as the deficiencies reported by the inspectors, we control for client characteristics, audit firm fixed effects, and year fixed effects in our multivariate tests.

We test our hypothesis by examining auditors' internal control opinions for fiscal years 2010-2013, where 2010 marks the first inspection-year in which the PCAOB explicitly directed its inspectors to focus on assessing whether audit firms were obtaining sufficient evidence to support their internal control opinions, and to communicate any identified deficiencies in their inspection reports (Franzel [2014]). Further, 2010 is the first year in which the PCAOB inspection reports disclose the number of audit engagements examined in the inspections of audit firms with 100 or more clients. This is critical because the number of engagements is necessary for computing the audit firm's rate of internal control audit deficiencies, as reported by PCAOB inspectors, which is a central feature of our research design.

Our primary analysis tests whether the audit firms' internal control "audit deficiency rates" predict their subsequent issuance of adverse internal control opinions. We compute the "audit deficiency rate" as the number of inspected engagements with identified internal control audit deficiencies, scaled by the total number of inspected engagements. We find that audit firms with higher deficiency rates subsequently issue more adverse internal control opinions. We further find that this increase is economically significant. Moving from the 25^{th} to the 75^{th} percentile in the deficiency rate, the predicted probability of issuing an adverse internal control opinion nearly doubles -- from 2.1% to 3.9%. We also find that our results hold for both Big Four and non-Big Four auditors, and are resilient to a variety of robustness tests. Taken together, our findings are consistent with the PCAOB inspection reports

identifying systematic shortcomings in audit firms' procedures, and with the issuance of those inspection reports prompting auditors to remediate the shortcomings by increasing the rigor of their internal control audits.

An alternative explanation for our findings is that auditors are attempting to appease the PCAOB simply by issuing more adverse opinions, irrespective of whether they are deserved. We address this issue in two ways. First, we observe that the objective of the inspections is to assess whether auditors gather sufficient audit evidence to support their internal control opinions. Thus, the inspections focus on assessing the audit process (i.e., the testing of internal controls), as opposed to the outcome of that process (i.e., the type of internal control opinion issued). This means that audit firms cannot avoid deficiencies in their inspection reports simply by issuing more adverse opinions, unless those opinions are supported by audit evidence. The inspectors' focus on evaluating the audit process, as opposed to the outcome of that process, is consistent with none of the inspection reports in our sample criticizing audit firms for failing to issue adverse opinions (i.e., the inspectors did not override the auditor's decision to issue a clean internal control opinion). It is also consistent with our finding that inspectors report failures to adequately *test* internal controls (17% of inspected engagements) more often than failures to assess the *materiality* of identified weaknesses (2% of inspected engagements). Moreover, both the testing and materiality deficiencies lead to increases in the issuance of adverse internal control opinions. This suggests that our results are driven by improvements in both internal control testing, and the auditor's evaluation of the materiality of detected weaknesses.

Second, we test whether critical PCAOB inspection reports prompt auditors to issue adverse opinions to clients who warrant such opinions. If more adverse opinions are issued to clients who deserve them, those clients are also more likely to have concurrent misstatements, because misstatements can only occur in companies with material weaknesses

(Rice and Weber [2012]). As predicted, we find that audit firms with higher deficiency rates subsequently issue more adverse opinions to clients who concurrently misstate (as revealed by a subsequent restatement). This is consistent with PCAOB inspections prompting auditors to issue more adverse internal control opinions to clients who warrant them. Thus, the increase in adverse opinions reduces what are commonly referred to as "Type II" errors (i.e., failing to issue an adverse opinion to a company that misstates).[3]

Another potential explanation is that audit firms attempt to appease the inspectors by issuing more adverse opinions in advance of the next inspection. We consider this unlikely because the inspection reports do not criticize auditors for failing to issue adverse opinions. Instead, the inspectors focus on deficiencies related to inadequate testing and evaluation of the materiality of identified control weaknesses (as discussed previously). Moreover, the auditor's internal control opinion does not influence the PCAOB's choice of which engagements to inspect (PCAOB [2009]). Consistent with this, we find that inspectors do not issue more favorable inspection reports to audit firms that issue more adverse internal control opinions in the period *before* the start of the inspection. Thus, while PCAOB inspection outcomes affect subsequent internal control opinions, internal control opinions do not affect subsequent PCAOB inspection outcomes.

Finally, we find that audit fees increase significantly for the clients of audit firms that receive inspection reports that disclose higher internal control deficiency rates. Further, the increase is economically significant. As internal control deficiency rates increase from the 25th percentile (4.0%) to the 75th percentile (27.3%), predicted audit fees increase by $63,000, equal to approximately 2% of mean audit fees. Finding an increase in firm-wide audit fees is consistent with audit firms responding to the deficiencies reported in the inspection reports

[3] We also note that what are commonly referred to as "Type I" errors (i.e., the issuance of an adverse opinion to a company that does not report a misstatement) are not reliable indicators of poor audit quality. This is because an adverse internal control opinion simply indicates the presence of a material weakness, and not all material weaknesses result in restatements.

by engaging in firm-wide remediation efforts to improve their internal control audit procedures across all of their clients, and corroborates the results of our main analysis.

Our findings make several contributions to the literature. First, we add to the literature that examines whether PCAOB inspections improve audit quality. A few studies find that PCAOB inspections help to improve audit quality or the perceived quality of financial reporting (Carcello et al. [2011], Lamoreaux [2016], Fung et al. [2014], Krishnan et al. [2014], Gipper et al. [2015]). However, these studies rely on the timing of PCAOB inspections rather than the *content* of the inspection reports.[4] Evidence linking the content of PCAOB inspection reports to subsequent audit outcomes is important because it provides relatively direct evidence that PCAOB inspections have a causal effect on audit quality. We further strengthen our causal inferences using a fixed effects design that is similar to a difference-in-differences estimation with a continuous treatment (e.g., Carpenter and Dobkin, 2011). We acknowledge, however, that like most accounting studies, we cannot completely rule out the possibility that PCAOB inspections are endogenously related to future internal control opinions.

In addition, most studies test for remediation by restricting their analysis to audit firms located outside of the US (Lamoreaux [2016], Fung et al. [2014], Krishnan et al. [2014]).[5] The focus on non-US auditors is likely due to inherent research design challenges in establishing an association between PCAOB inspections and subsequent remediation by US

[4] Gramling et al. [2011] find no association between going-concern deficiencies reported by inspectors and subsequent going-concern opinions issued by *triennially inspected* audit firms (i.e., audit firms with fewer than 100 clients), perhaps because going-concern deficiencies are rarely mentioned in PCAOB inspection reports. While Drake et al. [2016] find that Deloitte remediated the tax audit deficiencies disclosed in its 2007 Part II inspection report, their results may not generalize to other audit firms and inspections.

[5] Exceptions are concurrent working papers by Aobdia [2016] and Gipper et al. [2015]. Gipper et al. [2015] addresses the research design challenge by examining the staggered introduction of PCAOB inspections over time, however, they do not examine the content of PCAOB inspection reports and so they are unable to show that audit firms remediate the problems identified by the inspectors. Aobdia [2016] addresses the design issue by examining engagement-specific inspection data from the PCAOB, but does not examine the effects of deficiencies on auditors' reporting decisions.

audit firms. Identifying an appropriate control group of uninspected US auditors is difficult because *all* US public company audit firms are subject to inspections. In contrast, foreign auditors are only subject to PCAOB inspections when they have audit clients listed in the US, making it easier to test whether PCAOB inspections have remediation benefits among non-US audit firms (Lamoreaux [2016], Fung et al. [2014], Krishnan et al. [2014]). We address this challenge by examining differences in the *content* of PCAOB inspection reports over time. Our results suggest that auditors respond to PCAOB criticisms of their internal control audits by conducting more rigorous tests and evaluations of clients' internal control weaknesses after they are inspected. Our study illustrates the benefits of examining the *content* of PCAOB inspection reports when testing whether the inspections prompt audit firms to make remedial improvements to audit quality.

We also contribute to the literature on the auditor's opinion formulation process. While a large literature examines how auditors formulate their *financial statement* audit opinions, few studies examine how they formulate their *internal control* audit opinions (Ashbaugh et al. [2007], Doyle et al. [2007], Rice and Weber [2012]). Our study adds to the literature by showing that the downward trend in adverse internal control opinions from 2005-2009 reversed, with auditors becoming increasingly likely to issue adverse opinions from 2010-2013. Moreover, our findings are consistent with this reversal being explained by the PCAOB's increased emphasis on internal control audits from 2010 onwards. That is, our results are consistent with the PCAOB responding to the SEC's concerns by using its inspection program to improve the ability of auditors to identify and report material internal control weaknesses.

2. Background and Motivation

2.1 THE USE OF PCAOB INSPECTIONS TO IMPROVE THE QUALITY OF INTERNAL CONTROL AUDITS

Section 404 requires external auditors to opine on the effectiveness of clients' internal controls over financial reporting. Auditors must issue adverse opinions to clients with material weaknesses in their internal controls. The first internal control audits were performed under Auditing Standard No. 2 (AS2), which was widely criticized for requiring duplication of effort, resulting in excessive audit fees (Franzel [2014)]. The PCAOB investigated this criticism by focusing its 2006 inspections on assessing the efficiency of audits conducted under AS2 (PCAOB [2006]). Confirming the widespread criticism of AS2, the PCAOB replaced AS2 with Auditing Standard No. 5 (AS5) in November, 2007. AS5 attempts to improve upon AS2 by using a risk-based approach that eliminates unnecessary auditing procedures, thereby reducing audit fees (PCAOB [2007]).[6]

During 2007-2009, the PCAOB used its inspection program to monitor the transition from AS2 to AS5, and identified a number of audit deficiencies, which they summarized in a 2009 report (PCAOB [2009]). Shortly thereafter, the SEC reported a decline in auditors' issuance of adverse internal control opinions during 2005-2009, and suggested that the decline might result from auditors failing to identify or report material internal control weaknesses:

> "*the number of registrants reporting material weaknesses continues to decline. This decline could be due to registrants, on average, having addressed previously reported material weaknesses, while also having controlled all of the unique financial reporting risks introduced by recent economic conditions. Although this is possible given the focus and significant attention by registrants on managing financial reporting risks, another skeptical view is this trend could also be due to material weaknesses not being identified or reported*" (SEC [2009]).[7]

[6] Doogar et al. [2010] find that the switch from AS2 to AS5 resulted in significant fee reductions.

[7] Consistent with internal control weaknesses being underreported, Rice and Weber [2012] document that only 32 percent of restating companies disclose the existence of a material internal control weakness during the misstated time period.

In response to these concerns, the PCAOB changed the focus of its inspections to more closely scrutinize internal control audits (Franzel [2014]). Beginning with the 2010 inspections, the inspectors increasingly focused on assessing whether auditors were obtaining sufficient evidence to support their internal control opinions. In 2013, citing the large numbers of deficiencies reported in their inspections during 2010-2013, the PCAOB issued Staff Practice Alert No. 11, which provides auditor guidance in properly conducting internal control audits (PCAOB [2013]).

2.2 HYPOTHESIS DEVELOPMENT

The literature identifies several reasons why PCAOB inspections may not be a viable tool for improving audit quality. One is that the inspectors lack the ability to identify deficiencies whose remediation would improve internal control audits. For example, based on interviews with practicing auditors, Glover, Prawitt and Taylor [2009] suggest that inspectors lack the competence or expertise to understand complex auditing and accounting issues, and that inspection feedback is slow and ineffective. They conclude that the inspection process is fundamentally flawed and the inspections are creating an environment that is both inefficient and dysfunctional. Similarly, Dowling, Knechel and Moroney [2015] suggest that inspections motivate auditors to manage regulatory risk at the neglect of audit risk. They conclude that the PCAOB's enforcement techniques cause auditors to focus on trivial minutiae, and this change of auditor focus may actually impair audit quality. Johnson et al. [2015] suggest that the deficiencies identified during inspections may capture legitimate differences in professional judgment, rather than true audit deficiencies.

There is also criticism that auditors respond to inspector criticism by engaging in behavior that does not improve audit quality. For example, auditors often allege that deficiencies primarily involve a lack of audit documentation, a complaint that is denied by the PCAOB (Dowling et al. [2015], PCAOB [2012a] page 5). In particular, auditors argue

that they perform the appropriate auditing procedures, but simply fail to document them to the satisfaction of the inspectors.[8] While remediating such deficiencies through increased documentation may appease the inspectors, it will not affect the auditor's opinion.

Another potential threat to the effectiveness of PCAOB inspections is that the inspected engagements are not randomly chosen (Dowling et al. [2015]).[9] If the identified deficiencies are not representative of the audit firms' procedures, auditors are less likely to remediate, and remediation is less likely to have firm-wide effects on audit quality. An additional obstacle is that audit firms have incentives to avoid costly remediation, because clients may be reluctant to accept increased fees that result from increased audit effort triggered by remediation (Dowling et al. [2015]). In addition, if remediation increases the issuance of adverse opinions, it also increases the risk of auditor dismissal (Ettredge et al. [2011]; Newton et al. [2016]; Johnson et al. [2015]).

Despite the above criticisms of PCAOB inspections, if the inspectors do identify systematic firm-wide deficiencies, then audit firms have strong incentives to remediate their procedures. The PCAOB can impose penalties on auditors that provide substandard audits (Cohn [2015a], Cohn [2015b], Cohn [2015c]), including public censure, permanent revocation of PCAOB registration, barring individuals from associating with registered audit firms, and the imposition of fines. A recent annual report by the PCAOB indicates that it settled 24 disciplinary cases against auditors during 2014 (PCAOB [2015a]).

Audit firms also provide incentives to receive clean inspection reports by imposing financial penalties on audit teams who receive critical inspections, and by making inspection

[8] PCAOB [2012a] disagrees that the absence of audit documentation alone results in inspection deficiencies. Inspectors also consider whether there is other persuasive evidence to support a firm's contention that it performed undocumented procedures. Thus, there must be *both* the absence of documentation and the absence of other persuasive evidence that the procedure was performed, consistent with the requirements of AS3.

[9] The PCAOB inspectors do not examine every audit and their tests are not designed to identify every possible deficiency (Franzel [2014]). The PCAOB selects audits for inspection based on risk factors (PCAOB [2012b]), and only the higher-risk portions of an audit are typically examined during the inspections.

deficiencies one of the criteria in evaluating promotions to partner (Johnson et al. [2015]). Remediation is facilitated by in-house training programs that are designed to provide the knowledge to perform PCAOB-compliant audits. These programs include frequent debriefings on the latest PCAOB inspection findings. This suggests that auditors are capable of responding quickly to the deficiencies identified in the inspections.

In summary, if the PCAOB inspections are able to identify systemic audit deficiencies, then their remediation should improve the ability of auditors to identify and report material weaknesses in internal controls. The greater the number of audits with identified deficiencies relative to the number of engagements inspected, the more systemic the identified problems are likely to be, and the stronger the signal to the auditing firm that remediation is required. Thus, the greater the rate of internal control deficiencies identified in the inspection reports, the greater the likelihood of auditors remediating their procedures to detect and report material internal control weaknesses. Since auditors are required to issue adverse opinions to clients that are found to have material internal control weaknesses, this leads to the following hypothesis:

> *Hypothesis: Companies are more likely to receive adverse internal control opinions after their audit firms receive PCAOB inspection reports with higher internal control deficiency rates.*

3. Research design

3.1 SAMPLE PERIOD

Data come from the Audit Analytics database, COMPUSTAT, and the PCAOB website. Our sample comprises internal control reports with fiscal year-ends from January 1, 2010 through December 31, 2013. We begin our sample in 2010 because this is the year in which the PCAOB shifted its inspection efforts towards assessing whether auditors obtain sufficient evidence to support their internal control opinions. Importantly, 2010 is also the first year in which the PCAOB disclosed the number of audit engagements examined in their

annual audit firm inspections. Disclosing the number of each audit firm's inspected engagements allows us to compute the rate of internal control audit deficiencies for each audit firm inspection, which is a central feature of our research design.

3.2 MEASURING THE POST-INSPECTION WINDOW

Our primary tests examine whether auditors issue more adverse internal control reports subsequent to receiving PCAOB inspection reports that disclose relatively high rates of deficiencies in internal control audits. Our "post-inspection window" begins with the issue date of the most recent inspection report and ends with the date prior to the issuance of the next inspection report. Fig. 1 illustrates how we measure the post-inspection window for annually inspected and triennially inspected audit firms. For example, the PCAOB issued inspection reports to Deloitte & Touche on May 4, 2010, Dec 7, 2011, Nov 28, 2012, May 7, 2013, and May 6, 2014. Thus, the post-inspection window for the May 4, 2010 report begins on May 4, 2010, the day the report was issued, and ends on Dec 6, 2011, the day before the next inspection report is issued. Hence, we use the internal control audit deficiency rate in Deloitte's May 4, 2010 report to predict the internal control opinions issued by Deloitte to its clients during the period from May 4, 2010 to Dec 6, 2011. Similarly, the post-inspection window for Deloitte's Dec 7, 2011 report begins Dec 7, 2011 and ends on Nov 27, 2012, the day before the next inspection report is issued. Therefore, we use the internal control audit deficiency rate in Deloitte's Dec 7, 2011 report to predict the internal control opinions issued by Deloitte to its clients during the period from Dec 7, 2011 to Nov 27, 2012.

The post-inspection window for the triennially inspected audit firms is longer because they are inspected less frequently. For example, the PCAOB issued inspection reports to Brown, Edwards and Company on Sept 30, 2008, Aug 3, 2011, and Feb 27, 2014. The post-inspection window for the Sept 30, 2008 report begins on Sept 30, 2008 and ends on Aug 2, 2011, just before the next inspection report is issued; and the post-inspection window for the

Aug 3, 2011 report begins on Aug 3, 2011 and ends on Feb 26, 2014, just before the next inspection report is issued.

3.3 MODEL OF ADVERSE INTERNAL CONTROL REPORTS

We test our hypothesis by estimating eq. (1), which models the auditor's decision to issue an adverse internal control opinion:

$$ICOP_{i,t} = \alpha_1 DEF\_IC\%_{i,t} + \alpha_2 DEF\_NOT\_IC\%_{i,t} + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u \quad (1)$$

The dependent variable ($ICOP_{i,t}$) is a client-year variable that equals one if the auditor issues an adverse internal control opinion to company *i* in year *t*, where year *t* belongs to the post-inspection window, and equals 0 otherwise. The post-inspection window captures the period immediately following the issuance of the audit firm's inspection report. See Fig. 1 for further details about the measurement of the post-inspection window. Because accounting restatements can prompt revisions to previously issued clean internal control opinions, we use the originally-issued internal control opinion in cases where the opinion has been revised.

Our treatment variable is the internal control deficiency rate ($DEF\_IC\%_{i,t}$), which is measured at the audit firm-level and equals the number of audits by company *i*'s audit firm that are found by PCAOB inspectors to have internal control deficiencies, divided by the total number of audits examined in the inspection, where the PCAOB inspection occurs at the start of the post-inspection window and prior to the auditor's issuance of the internal control opinion for year *t*. We expect audit firms to issue more adverse internal control reports following PCAOB inspection reports that disclose higher deficiency rates. We therefore predict a positive coefficient on $DEF\_IC\%_{i,t}$ (i.e., $\alpha_1 > 0$).

PCAOB inspection reports also disclose deficiencies that are unrelated to internal control audits, primarily deficiencies in substantive testing and analytical procedures. We expect auditors to modify their internal control procedures in response to internal control deficiencies, but not in response to deficiencies unrelated to internal controls. This allows us

to conduct a falsification test by including in Eq. (1) the variable $DEF\_NOT\_IC\%_{i,t}$, which equals the number of audits by company *i*'s audit firm that are found by PCAOB inspectors to have deficiencies unrelated to internal control audits, divided by the total number of audits examined in the inspection. Because these deficiencies are unrelated to internal control audits, we expect an insignificant coefficient on $DEF\_NOT\_IC\%_{i,t}$.[10]

We include *Year fixed effects* in eq. (1) to control for time variation in adverse internal control reports. We also control for *Audit firm fixed effects* because the reporting of internal control weaknesses is likely to vary across audit firms. By controlling for audit firm and year fixed effects, our empirical identification strategy resembles a difference-in-differences estimation with a continuous treatment (e.g., Carpenter and Dobkin, 2011). In particular, we test whether auditors issue more adverse internal control reports subsequent to PCAOB inspectors reporting higher deficiency rates in internal control audits.

3.4 CONTROL VARIABLES

We include several control variables based on prior research (Ashbaugh et al. [2007], Doyle et al. [2007], Rice and Weber [2012]). The motivation for each of the control variables is discussed in Section I of the Internet Appendix, and the variable definitions are presented in the Appendix to this text.

4. Results

4.1 TRENDS IN ADVERSE INTERNAL CONTROL AUDIT OPINIONS AND INSPECTION DEFICIENCIES

4.1.1 Trends in Auditors' Issuance of Adverse Internal Control Opinions

We begin by assessing the SEC's assertion that the incidence of adverse internal control opinions declined from 2005-2009 (SEC [2009]), and the PCAOB's assertion that the

[10] A PCAOB inspection report may disclose that an inspected audit has *both* internal control deficiencies *and* other types of deficiencies. These audits are captured by the $DEF\_IC\%_{i,t}$ variable. $DEF\_NOT\_IC\%_{i,t}$ captures the audits that are found to have deficiencies that are unrelated to internal controls.

incidence of reported deficiencies in internal control audits increased after inspectors increased their scrutiny of internal control audits during 2010-2013 (PCAOB [2013]). Col. (1) of Table 1 reports the frequency of adverse opinions during 2005-2013. Col. (2) reports the same information for the sub-sample of companies whose financial statements are misstated in the year of the audit report, as revealed by a *subsequent* restatement. Thus, Col. (2) is a sub-sample of companies for which adverse opinions are warranted.

Consistent with the SEC's assertions, Col. (1) reports a downward trend in adverse internal control reports from 2005-2009, particularly after 2007, which marks the transition from AS2 to AS5. Panel A shows that the proportion of adverse opinions issued for Big Four clients declines from 10.0% in 2005 to 6.3% in 2007, then to 2.6% in 2009.[11] Col. (2) of Table 1 also reports a downward trend in adverse internal control reports from 2005-2009 for companies with concurrent misstatements. Panel A shows that the proportion of adverse opinions issued to Big Four clients with concurrent misstatements declines from 19.9% in 2005 to 13.8% in 2007, then to 4.9% in 2009. Similar downward trends are observed for the clients of annually inspected non-Big Four auditors in Panel B, and for the clients of triennially inspected auditors in Panel C.[12]

Cols. (1) and (2) also document that the downward trend in adverse opinions ends in 2010, then subsequently reverses. Col. (1) of Panel A indicates that the proportion of adverse reports among the clients of Big Four auditors rises from 1.9% in 2010 to 3.6% in 2013.[13] A similar pattern occurs in the sub-sample of misstatement firms in Col. (2), and for the clients

[11] Regressing $ICOP_{i,t}$ on the time trend for 2005-2009 finds a significant negative coefficient of -0.283 (z-stat. = -17.55).

[12] The proportion of internal control audits with adverse opinions is generally higher for triennially inspected auditors across all years, which is consistent with the clients of triennially inspected auditors having poorer internal controls compared with the clients of annually inspected auditors.

[13] Regressing $ICOP_{i,t}$ on the time trend for 2010-2013 finds a significant positive coefficient of 0.089 (z-stat. = 2.34).

of annually inspected non-Big Four auditors in Panel B, and the clients of triennially inspected auditors in Panel C.

One minus the percentages reported in Col. (2) gives what are often referred to as "Type II" error rates. In the context of internal control opinions, Type II errors refer to engagements where the auditor issues a clean opinion to a client whose financials are concurrently misstated. The presence of a concurrent misstatement indicates that the auditor erroneously issued a clean opinion, because misstatements can only occur in companies with material weaknesses (Rice and Weber [2012]). We caution, however, that this understates the true Type II error rate, because clients can have undetected (and hence unreported) material internal control weaknesses that never result in a misstatement (or result in a misstatement that is never discovered). Thus, the issuance of a clean opinion for a client that does not report a concurrent misstatement does not necessarily mean that the auditor issued the "correct" opinion.

With the above caveat in mind, the percentages shown in Col. (2) suggest that Type II error rates increased over 2005-2009, growing from 80.1% in 2005 (100% − 19.9%), to 95.1% in 2009 (100% − 4.9%). The Type II error rates then declined over 2010-2013, falling from 96.2% in 2010 (100% − 3.8%), to 91% in 2013 (100% − 9%). These trends are consistent with the SEC's concerns that the quality of internal control audits declined during 2005-2009, then increased after the PCAOB increased their scrutiny of internal control audits during 2010-2013.[14]

Finally, Col. (2) indicates that the Type II error rates for internal control audits are high, consistent with prior research that also documents a low rate of adverse opinions among firms with concurrent misstatements (Rice and Weber, 2012). This low rate is expected, since

[14] We note that computing Type I errors would be problematic because an adverse opinion is not a prediction of a concurrent or future misstatement. Rather, adverse opinions indicate the presence of a material weakness that presents "a reasonable possibility" (under AS2) or "more than a remote possibility" (under AS5) that a material misstatement would not be prevented or detected on a timely basis.

auditors who fail to identify misstatements are also likely to fail to identify material weaknesses. Allowing a material misstatement to go undetected is an indication of a low quality audit, which is consistent with the auditor also failing to identify and report material weaknesses in internal controls.

4.1.2 Trends in Inspections that Report Deficiencies in Internal Control Audits

Cols. (3) through (5) of Table 1 report information from the PCAOB inspection reports, which we use to calculate the audit firms' deficiency rates ($DEF\_IC\%_{i,t}$). Col. (3) reports the mean number of inspected audits with deficiencies, Col. (4) the mean number of audits examined in each inspection, and Col. (5) the mean deficiency rate per inspection, computed by dividing Col. (3) by Col. (4).[15] Cols. (3) and (5) show that, beginning in 2010, there is an upward trend in both the number and proportion of inspected audits with reported deficiencies. For example, Panel A indicates that the mean number (proportion) of Big Four audits with deficiencies increases from 2.50 (3.78%) in 2010 to 16.50 (32.65%) in 2013. A similar pattern is found for the annually inspected non-Big Four firms in Panel B, and (to a lesser degree) for the triennially inspected auditors in Panel C. This pattern is consistent with the PCAOB's assertion that it intensified its examination of internal control audits during 2010-2013, and with the PCAOB ratcheting up its scrutiny of internal control audits in each successive year, as suggested in PCAOB [2014].

4.1.3 Evaluating the Trends in Internal Control Opinions and Inspection Deficiencies

The trends in Table 1 are consistent with the SEC's assertions that the quality of internal control audits may have declined during 2005-2009, and with the PCAOB responding by increasing its scrutiny of internal control audits during 2010-2013. There are, however, other potential explanations for the univariate time trends in Table 1. For example,

[15] The inspection reports do not disclose whether the inspected audit is a SOX 404 audit or a non-SOX 404 audit. Therefore, the denominator for the deficiency rate cannot be restricted to SOX 404 audits. The deficiency rates for the triennially inspected auditors in Col. (4) are lower than those for the annually inspected auditors because a higher proportion of their clients are not subject to SOX 404.

the downward trend in adverse opinions over 2005-2009 could be explained by improvements in companies' internal controls, and by the transition to AS5, which increased the threshold for classifying material weaknesses from "more than remote" to "reasonably possible." Thus, we cannot conclude from the time trends in Table 1 that the quality of internal control audits declined during 2005-2009. Importantly, we emphasize that our hypothesis does not assume that the declining trend in adverse opinions during 2005-2009 indicates a decline in the quality of internal control audits (as suggested by the SEC). However, if our hypothesis is supported, this would be consistent with the inspectors' increased focus on internal control audits helping to improve the quality of internal control audits during 2010-2013.

We also note that the upward trend in adverse opinions during 2010-2013 does not necessarily imply that the quality of internal control audits improves over this period. An alternative explanation is that the trend is due to changes in macroeconomic factors. For example, the quality of internal controls among the population of accelerated filers may have deteriorated over this period. This could result from managers failing to update their internal control systems to accommodate changes in the economic environment, leading auditors to issue more adverse opinions. Because these macro-level factors may help explain the upward trend in adverse opinions during 2010-2013, we control for them by including year fixed effects in our multivariate tests.

4.2 DESCRIPTIVE STATISTICS AND UNIVARIATE RESULTS

Table 2 provides descriptive statistics for our sample, which comprises 13,933 internal control reports for fiscal years 2010-2013, issued by 102 audit firms, 8 of which are annually inspected and 94 of which are triennially inspected. The vast majority of internal control reports are issued by the Big Four (N = 11,778). The annually inspected non-Big Four firms issue 1,280 internal control reports, while the 94 triennially inspected non-Big Four

firms issue 875. The proportion of adverse opinions ranges from 1.90% to 3.04% for the Big Four, and 1.92% to 5.35% for the other auditors. The lower proportion among Big Four auditors is likely because their clients have higher quality internal controls and hence are less likely to receive adverse opinions.

Table 2 shows that our sample includes 342 inspections: 32 for the eight annually inspected audit firms (four for each audit firm), and 310 for the 94 triennially inspected audit firms. Averaged over the four sample years (2010-2013), the percentages of inspected engagements with deficiencies in internal control audits ranges from 9.95% to 27.56% for the annually inspected auditors, and is 4.83% for the triennially inspected auditors.[16] Because the PCAOB inspection process is not random, however, these rates are likely to exceed the audit firms' true underlying deficiency rates.[17]

Table 3 reports the mean values of the independent variables after partitioning the sample by the type of internal control report. There are 409 client-year observations with adverse opinions, and 13,524 with clean opinions issued during the post-inspection windows. Consistent with PCAOB inspection efforts remediating auditor behavior, we find a significant positive association between the deficiency rate and auditors' subsequent issuance of adverse opinions during the post-inspection windows. The average deficiency rate ($DEF\_IC\%_{i,t}$) is 19.48% in the sub-sample with adverse opinions, and 16.83% in the sub-sample with clean opinions, with the difference highly significant (t-stat. = 3.98).[18] However, this univariate test

[16] Although untabulated, there is a relatively large variation in the percentage of inspected audits with internal control audit deficiencies. For example, Grant Thornton's internal control audit deficiency rate increases from 2.56% in 2010 to 48.39% in 2013, whereas McGladrey's rate increases from 5.61% in 2010 to 9.29% in 2013.

[17] The much smaller rate of deficiencies among triennially inspected auditors arises because most of their clients are non-accelerated filers, who do not require internal control audits under SOX Section 404. When auditing non-accelerated filers, auditors only need to test the controls that they intend to rely upon, and can skip tests of internal controls that they believe are too weak to provide a basis for reliance (in which case they rely on substantive tests instead). Thus, because triennially inspected auditors are generally required to perform fewer tests of internal controls, PCAOB inspectors are less likely to identify internal control audit deficiencies on those engagements.

[18] While not tabulated, the median values of $DEF\_IC\%_{i,t}$ are 18.31% when $ICOP_{i,t} = 1$ and 13.46% when $ICOP_{i,t} = 0$, and the difference is significant at the 1% level two-tailed ($Chi^2 = 10.17$).

does not control for other factors that explain internal control reporting, so we draw our conclusions from the multivariate tests in Table 4.

Importantly, we find an insignificant association between deficiencies that are unrelated to internal controls and subsequent adverse opinions. The average deficiency rate for audits whose deficiencies are unrelated to internal controls ($DEF\_NOT\_IC\%_{i,t}$) is 12.89% in the sub-sample with adverse opinions and 12.11% in the sub-sample with clean opinions. The difference is insignificant at conventional levels.

Univariate results for the control variables are generally consistent with expectations. An auditor is significantly more likely to issue an adverse opinion when the client: 1) receives an adverse opinion in the prior year ($ICOP_{i,t-1}$), 2) misstates its financial statements ($MISSTATE_{i,t}$), 3) recently experiences an auditor resignation ($RESIGN_{i,t}$), 4) has lower non-audit service fees ($Ln(NAS)_{i,t}$), 5) is smaller ($SIZE_{i,t}$), 6) reports a loss ($LOSS_{i,t}$), 7) has foreign operations ($FOREIGN_{i,t}$), and 8) has more inventory ($INVENTORY_{i,t}$). The other control variables are not statistically significant.

4.3 MULTIVARIATE RESULTS

Table 4 reports the regression results for Eq. (1). The standard errors are corrected for clustering on each company because there are repeated annual observations during our sample period (2010-2013).[19] Col. (1) reports results for all auditors, while Cols (2) and (3) report results separately for the Big Four and Non-Big Four auditors. Consistent with higher deficiency rates leading to an increase in adverse opinions, Col. (1) reports a positive coefficient on $DEF\_IC\%_{i,t}$, the deficiency rate during the audit firm's most recent inspection, and the $DEF\_IC\%_{i,t}$ coefficient is highly significant (z-stat. = 5.70). This indicates that audit firms issue more adverse opinions after they receive PCAOB inspection reports with higher deficiency rates in internal control audits. These findings are consistent with audit firms

[19] Our inferences are unchanged if the standard errors are clustered on each audit firm.

responding to critical inspections by remediating their audit procedures related to internal controls during the post-inspection windows. Cols. (2) and (3) find that the coefficients on $DEF\_IC\%_{i,t}$ are significantly positive for both Big Four and Non-Big Four auditors (z-stats. = 4.47 and 3.28).[20] We also find that, as $DEF\_IC\%_{i,t}$ increases from the 25th percentile (4.0%) to the 75th percentile (27.3%), the predicted probability of an adverse opinion nearly doubles from 2.07% to 3.89%. Therefore, our results are economically significant as well as statistically significant.

Notably, we do not find significant results for inspector-reported deficiencies that are unrelated to internal controls. The coefficients on $DEF\_NOT\_IC\%_{i,t}$ are insignificant at conventional levels in all three regressions. Therefore, while auditors' internal control opinions are associated with the internal control deficiencies found by PCAOB inspectors, they are not associated with the other types of audit deficiencies. Results for the control variables are generally consistent with the univariate analysis in Table 3 and prior research.

While the Table 4 results are consistent with the quality of internal control audits increasing during 2010-2013, we note that the proportion of identified deficiencies also increased over this period (Table 1). There are several potential explanations for the upward trend in the deficiency rate from 2010-2013 even as audit quality was improving. One is that the PCAOB was "ratcheting" up its scrutiny in each successive year. This is consistent with the PCAOB indicating that it used feedback from the internal control audit inspections each year to direct the focus of subsequent inspections (PCAOB [2014]). This ratcheting up over time is also consistent with auditors' assertions that the requirements for meeting the PCAOB's expectations have increased over time (Johnson et al. [2015]).

[20] The coefficient on $DEF\_IC\%_{i,t}$ is significantly larger for the Big Four audit firms than the Non-Big Four (p-value < 0.01). This suggests that there is a stronger remediation effect for the Big Four audit firms.

In addition, because the inspectors do not inspect the entire engagement, a clean inspection report does not mean that *all* areas of the inspected audit are satisfactory. Thus, even if an engagement receives a clean inspection report, an identical engagement could receive a deficient report in the subsequent year, even if the two engagement teams perform identical procedures (Johnson et al. [2015]). Further, effective remediation may not occur simultaneously across all engagements within an audit firm (Tysiac [2014]).[21] Therefore, even when an audit firm remediates, some engagements may still contain deficiencies.

4.4 TYPES OF INTERNAL CONTROL DEFICIENCIES IDENTIFIED BY PCAOB INSPECTORS

This section examines whether PCAOB inspectors focus on deficiencies in internal control *testing* (i.e., the audit process) or internal control *reporting* (i.e., audit outcomes). This is important because remediation is meaningful only if auditors improve the specific deficiencies identified by the inspectors, rather than simply issuing more adverse opinions. If most of the identified deficiencies involve audit *testing* rather than audit *reporting*, audit firms are unlikely to satisfy the inspectors merely by issuing more adverse opinions.

We begin by classifying the identified deficiencies ($DEF\_IC\%_{i,t}$) into two broad categories: (1) inadequate *tests* of internal controls, which potentially result in failing to *detect* the existence of a material weakness; and (2) inappropriate evaluation of the *materiality* of a detected weakness, which potentially results in failing to *report* a material weakness. We define inadequate *tests* ($DEF\_IC\_TEST\%_{i,t}$) as the number of audits where the PCAOB inspectors concluded that the auditor failed to adequately test internal controls, divided by the total number of audits examined during the inspection. We define failures to appropriately evaluate *materiality* ($DEF\_IC\_MATERIAL\%_{i,t}$) as the number of audits where the PCAOB inspectors indicate that the auditor failed to adequately evaluate the materiality

[21] This is consistent with comments by PCAOB board member Jay Hansen: "The problems usually lie in the execution. Do the teams actually follow the methodologies? And that's where we see inconsistencies from engagement team to engagement team within firms" (Tysiac [2014]).

of an identified weakness, divided by the total number of audits examined during the inspection. Panel A of Table 5 reports descriptive statistics for these variables. The mean value of $DEF\_IC\_TEST\%_{i,t}$ is 16.90% while the mean value of $DEF\_IC\_MATERIAL\%_{i,t}$ is 1.82%.[22] Therefore, most deficiencies relate to inadequate testing rather than inadequate evaluation of materiality.

We emphasize that the deficiencies identified by inspectors do not necessarily mean that the auditor failed to identify or report an existing material weakness. Rather, they indicate that the auditor failed to properly test for a material weakness ($DEF\_IC\_TEST\%_{i,t}$), or failed to properly evaluate the materiality of a detected weakness ($DEF\_IC\_MATERIAL\%_{i,t}$). None of the inspection reports in our sample speculate on whether the proper performance of the test or the proper evaluation of the weakness would have resulted in the auditor issuing an adverse opinion.

We disaggregate $DEF\_IC\_TEST\%_{i,t}$ into three sub-categories, which describe the type of test that the inspectors assert was inadequately performed: (1) inadequate tests of specific account balances ($DEF\_IC\_TEST\_AC\%_{i,t}$), (2) inadequate tests of information technology controls ($DEF\_IC\_TEST\_IT\%_{i,t}$), and (3) inadequate tests due to over-reliance on the work of others ($DEF\_IC\_TEST\_OTHERS\%_{i,t}$). These (non-mutually exclusive) variables are measured similar to $DEF\_IC\_TEST\%_{i,t}$, as described in Table 5. Panel B of Table 5 reports descriptive statistics on each of these three types of testing deficiency. The mean value of $DEF\_IC\_TEST\_AC\%_{i,t}$ is 15.80%, the mean value of $DEF\_IC\_TEST\_IT\%_{i,t}$ is 2.88%, and the mean value of $DEF\_IC\_TEST\_OTHERS\%_{i,t}$ is 3.83%. Therefore, the most frequent type of deficiency is the failure to adequately test internal controls relating to specific accounts.

[22] All engagements with *materiality* deficiencies (1.82%) also have *testing* deficiencies (16.90%). Thus, 15.08% of our sample have only *testing* deficiencies (16.90% − 1.82%), while 1.82% have both *materiality* and *testing* deficiencies. There are no engagements with only *materiality* deficiencies.

Next, we examine whether the regression results in Table 4 are explained by the inspectors' detection of inadequate testing ($DEF\_IC\_TEST\%_{i,t}$) or inadequate evaluation of materiality ($DEF\_IC\_MATERIAL\%_{i,t}$). If auditors respond to these two types of deficiencies by improving both their testing and materiality evaluation, we would expect significant positive coefficients on $DEF\_IC\_TEST\%_{i,t}$ and $DEF\_IC\_MATERIAL\%_{i,t}$. Panel C of Table 5 reports regression results for the model of internal control reporting. The first column reports significant positive coefficients on both $DEF\_IC\_TEST\%_{i,t}$ (z-stat. = 4.88) and $DEF\_IC\_MATERIAL\%_{i,t}$ (z-stat. = 3.02). Therefore, auditors issue more adverse opinions in response to reported deficiencies in their *tests* of internal controls, as well as in their *evaluation* of the materiality of detected weaknesses. The second column of Panel C reports that the results for testing deficiencies ($DEF\_IC\_TEST\%_{i,t}$) are primarily explained by inadequate tests of specific accounts ($DEF\_IC\_TEST\_AC\%_{i,t}$, z-stat. = 4.62). The results for the other two types of testing deficiencies are insignificant at conventional levels.

In summary, Table 5 is consistent with the inspector-identified deficiencies triggering subsequent remediation; and with the PCAOB inspections being most effective in remediating deficiencies relating to inadequate testing at the account level, and inadequate evaluation of the materiality of identified weaknesses.

4.5 COMPANIES WITH MATERIAL ACCOUNTING MISSTATEMENTS

This section tests whether the inspections prompt auditors to issue adverse opinions to clients who genuinely deserve them. If auditors respond to the identified deficiencies by issuing adverse opinions to clients who warrant such opinions, we would expect more adverse opinions being issued to companies whose financial statements are concurrently misstated. This expectation is based on the observation that material misstatements can only occur in companies with material weaknesses (Rice and Weber [2012]). We explore this by

testing whether the inspector-identified deficiencies prompt auditors to issue adverse opinions to companies that subsequently restate a concurrent misstatement.

To test this, we add a term to Eq. (1) that captures the interaction between our treatment variable ($DEF\_IC\%_{i,t}$) and the misstatement variable ($MISSTATE_{i,t}$). Recall that $MISSTATE_{i,t}$ captures concurrent period misstatements that are revealed through a restatement announced in a subsequent period.

$$ICOP_{i,t} = \alpha_1 DEF\_IC\%_{i,t} + \alpha_2 DEF\_IC\%_{i,t} \times MISSTATE_{i,t} + \alpha_3 MISSTATE_{i,t} + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u \quad (2)$$

The coefficients in Eq. (2) are interpreted as follows:

α_1 = the effect of $DEF\_IC\%_{i,t}$ on $ICOP_{i,t}$ for companies *without* a concurrent misstatement.

α_2 = the *difference* in the effect of $DEF\_IC\%_{i,t}$ on $ICOP_{i,t}$ for companies *with* and *without* a concurrent misstatement.

$\alpha_1 + \alpha_2$ = the effect of $DEF\_IC\%_{i,t}$ on $ICOP_{i,t}$ for the subset of companies *with* a concurrent misstatement.

α_3 = the main effect of $MISSTATE_{i,t}$ on $ICOP_{i,t}$ (when $DEF\_IC\%_{i,t} = 0$).

If auditors issue more adverse opinions to companies that warrant them, we expect significantly more adverse opinions to be issued to companies with concurrent misstatements (i.e., $\alpha_1 + \alpha_2 > 0$). We have no prediction for the companies that *do not* report a misstatement (i.e., α_1), because it is unclear whether these companies should receive clean or adverse opinions. The issuance of an adverse opinion (under AS5) merely means that there is a "reasonable possibility" that a material misstatement will not be prevented or detected on a timely basis. An adverse opinion does not necessarily indicate that there is a concurrent misstatement, or that such a misstatement would be subsequently detected and restated if it *did* occur. Thus, the *absence* of a concurrent misstatement does not allow us to infer whether the auditor was "correct" in issuing an adverse or a clean opinion.

The results for eq. (2) are reported in Table 6. We suppress the results for the control variables since they are similar to those reported in Table 4. We find that $\alpha_1 + \alpha_2$ is significantly positive, indicating that the inspections prompt auditors to issue more adverse opinions to companies that warrant them. Table 6 also reports that $\alpha_1 + \alpha_2$ is significantly positive in the sub-sample of Big Four auditors, but insignificant in the much smaller sample of Non-Big Four auditors.

We also find positive coefficients on $DEF\_IC\%_{i,t}$ and $MISSTATE_{i,t}$. The positive coefficient on $DEF\_IC\%_{i,t}$ implies that auditors issue more adverse opinions even when the audited financial statements are not misstated (i.e., $MISSTATE_{i,t} = 0$). This is consistent with the inspection deficiencies prompting auditors to perform additional substantive testing, which increases the chance of finding and correcting a misstatement before the financial statements are released to investors. The positive coefficient on $MISSTATE_{i,t}$ indicates that auditors are more likely to issue an adverse opinion to clients with material misstatements, even when the PCAOB inspectors find no deficiencies (i.e., when $DEF\_IC\%_{i,t} = 0$). This indicates that clients are more likely to have material misstatements when auditors issue adverse internal control opinions. Finally, we find an insignificant coefficient on $DEF\_IC\%_{i,t} \times MISSTATE_{i,t}$ (z-stat. = -0.46). This is important, because a significant negative coefficient on this interaction would indicate that auditors respond to higher deficiency rates ($DEF\_IC\%_{i,t}$) by issuing fewer adverse internal control opinions to clients with misstatements.[23]

[23] We note that our analysis does not test whether the reported misstatement relates to the material weakness in internal controls that led to the adverse internal control opinion. The adverse opinion should cause the auditor to look more closely at the accounts that could be misstated as a result of the material weakness, suggesting that these accounts are less likely to be misstated. If the reported misstatement does pertain to the accounts affected by the material weakness, it suggests that auditors may not be adequately adapting their audit procedures to the increased risks imposed by material control weaknesses.

4.6 ADVERSE INTERNAL CONTROL OPINIONS AS INDICATORS OF FUTURE RESTATEMENTS

Companies with material internal control weaknesses are more likely to misstate their accounts. Thus, companies that receive adverse internal control opinions are more likely to subsequently announce a restatement, implying that adverse opinions are timely indicators of the risk of a future restatement. In this section, we test whether adverse internal control opinions continue to be timely indicators of future restatements when they are issued subsequent to the inspector-identified deficiencies.

We explore this by first estimating eq. (3a):

$$RESTATE_{it+1} = \alpha_1 ICOP_{it} + \alpha_2 DEF\_IC\%_{i,t} + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u \quad (3a)$$

The dependent variable ($RESTATE_{it+1}$) equals one if company *i* announces an accounting restatement in the year following the auditor's issuance of the internal control opinion. $ICOP_{it}$ equals one if the auditor issues an adverse opinion to company *i* in year *t*, and zero if the auditor issues a clean opinion. We expect $\alpha_1 > 0$ if adverse opinions are timely indicators of future restatement risks.

Next we test whether the adverse opinions that are issued following critical inspection reports are less timely signals of future restatements. Specifically, we include the interaction term $ICOP_{it} \times DEF\_IC\%_{i,t}$ in eq. (3b):

$$RESTATE_{it+1} = \alpha_1 ICOP_{it} + \alpha_2 DEF\_IC\%_{i,t} + \alpha_3 ICOP_{it} \times DEF\_IC\%_{i,t} + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u \quad (3b)$$

We expect α_3 to be insignificantly different from zero if the ability of adverse opinions to predict future restatements is unchanged when the adverse opinions are issued following critical PCAOB inspection reports.

Table 7 reports the results for Eqs. (3a) and (3b). Consistent with adverse opinions being timely predictors of future restatements, we find a positive and highly significant coefficient on $ICOP_{it}$ in (3a) (z-stat. = 9.37). Moreover, the ability of adverse opinions to

predict future restatements is not impaired when the adverse opinions are triggered by critical PCAOB inspection reports. In particular, we find that α_3 is insignificant in Eq. (3b). This indicates that PCAOB inspection reports do not prompt auditors to issue more adverse opinions to companies that have a low risk of future restatement. Together, the results in Tables 6 and 7 suggest that PCAOB inspections motivate auditors to issue more adverse opinions to companies that genuinely deserve them.

4.7 DO AUDIT FIRMS ISSUE ADVERSE OPINIONS TO OBTAIN MORE LENIENT OUTCOMES IN FUTURE INSPECTIONS?

Another explanation for our results is that audit firms attempt to appease the inspectors by issuing more adverse opinions prior to the inspections, in the hope they will lead to more lenient inspection outcomes. We consider this alternative explanation unlikely because the inspectors focus on deficiencies related to the testing of controls rather than the issuance of an adverse opinion (Table 5). Therefore, auditors are unlikely to satisfy the inspectors by merely issuing more adverse opinions without concurrent improvements in control testing or their evaluation of materiality. Moreover, as early as 2009, the PCAOB publicly disclosed that inspectors do *not* choose to examine an engagement based on whether the client previously received a clean or adverse internal control opinion. Specifically, PCAOB Release No. 2009-006 states that its inspectors select audit engagements:

> *"without regard to whether the ICFR audits resulted in adverse or unqualified opinions and without regard to the number or extent of internal control deficiencies identified by the engagement team during the audit."*

Thus, the PCAOB asserts that it was not using prior year opinions to select engagements for inspection during the period of our analysis.[24]

[24] There are two reasons why reverse causality is unlikely to affect our main results in Table 4. First, inspectors are only able to observe *past* engagements, whereas the dependent variable in Table 4 captures internal control reports issued *subsequent* to the inspection (Fig. 1). Second, Table 4 controls for adverse internal control opinions issued during the previous year ($ICOP_{i,t-1}$), helping to control for selection bias that may arise if inspectors select engagements based upon internal control reports issued before the inspection starts.

Nevertheless, it is an empirical question whether the PCAOB actually followed this policy. If they did not, then auditors may have learned over time that they could appease the inspectors and obtain more lenient inspection outcomes by simply issuing more adverse opinions. We investigate this by testing whether internal control opinions issued prior to the inspections are associated with the deficiency rates subsequently reported by the inspectors. For example, the inspection report issued to Deloitte & Touche on Dec 7, 2011 discloses that the inspection began in October 2009. Thus, we test whether the deficiency rate disclosed in the Dec 7, 2011 inspection report is associated with the internal control opinions previously issued by Deloitte and Touche during the period leading up to October 2009. In this example, the "pre-inspection" window for Deloitte & Touche's inspection report issued on Dec 7, 2011 is measured from October 1, 2008 (the start of the previous year's inspection) to September 30, 2009 (the day before the start of the current year's inspection).

We test whether internal control opinions issued during the pre-inspection window are associated with subsequent inspection outcomes by estimating eq. (4):

$$PRE\_ICOP_{i,t} = \beta_1 DEF\_IC\%_{i,t} + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u \quad (4)$$

$PRE\_ICOP_{i,t}$ equals one if the auditor issues an adverse internal control report to company *i* in year *t*, where year *t* belongs to the pre-inspection window, and zero otherwise. If audit firms issue adverse opinions in order to receive more favorable outcomes in the next inspection, we would expect a significant negative association between $PRE\_ICOP_{i,t}$ and $DEF\_IC\%_{i,t}$; i.e., $\beta_1 < 0$.

Table 8 reports the results from eq. (4) and finds that β_1 is insignificant in all three models. This is consistent with auditors being unable to obtain more favorable inspection outcomes merely by issuing more adverse opinions in the period prior to the inspection

starting.[25] This suggests that auditors need to genuinely improve their internal control audit procedures rather than simply issue more adverse opinions.

We note, however, that while the evidence suggests that the PCAOB followed its stated policy of not selecting engagements based on the prior year's internal control opinion, we do not know what the inspectors privately communicated to the audit teams. If the inspectors privately indicated that inspected engagements were chosen based on the prior opinion, auditors may still have changed their behavior in an attempt to influence future inspections. Thus, while we do not find that PCAOB inspection outcomes are affected by internal control opinions issued in the prior year, we are unable to directly observe whether auditors changed their opinions in an attempt to manipulate the inspection process.

4.8 PCAOB INSPECTION DEFICIENCIES AND SUBSEQUENT AUDIT FEES

If critical PCAOB inspection reports spur auditors to conduct more rigorous internal control audits, and if clients absorb those costs, we expect audit fees to increase following inspections with higher deficiency rates. In contrast, if audit firms respond to deficiencies by mechanically issuing more adverse opinions, we do not expect an increase in audit fees. We test this by estimating the following audit fee model:

$$Ln(AF)_{i,t} = \alpha_1 DEF\_IC\%_{i,t} + \alpha_2 DEF\_NOT\_IC\%_{i,t} + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u \quad (5)$$

This model regresses the log of audit fees on the rate of reported internal control audit deficiencies ($DEF\_IC\%_{i,t}$), the rate of deficiencies unrelated to internal control audits ($DEF\_NOT\_IC\%_{i,t}$), lagged audit fees ($Ln(AF)_{i,t-1}$), and additional control variables.

Table 9 presents results for the audit fee model, with the sample dropping from 13,933 to 13,873 observations because we require data on lagged audit fees. Col. (1) reports

[25] We also rerun this analysis using $DEF\_IC\%_{i,t}$ as the dependent variable, and include $PRE\_ICOP_{i,t}$ as an independent variable (along with all of the control variables). This analysis (not tabled) finds an insignificant coefficient on $PRE\_ICOP_{i,t}$ for the full sample, and for the sub-samples of Big Four and non-Big Four auditors (t-stats. = -0.28, -1.45, 0.32, respectively). Thus, this additional analysis also indicates that auditors are unable to game the inspections by issuing more adverse internal control opinions prior to the inspection.

results for all auditors, while Cols. (2) and (3) report results for the Big Four and Non-Big Four auditors. We find significant positive coefficients on $DEF\_IC\%_{i,t}$ in all three samples (t-stats. = 3.13, 2.89 and 1.94, respectively), consistent with audit costs increasing following inspector-identified deficiencies in internal control audits. We also find that the average fee increase is economically significant. As $DEF\_IC\%_{i,t}$ increases from the 25th percentile (4.0%) to the 75th percentile (27.3%), predicted audit fees increase by $63,000, equal to approximately 2% of mean audit fees.[26]

Table 9 also finds that the coefficient on $DEF\_NOT\_IC\%_{i,t}$ is insignificant in all three models. This is notable because $DEF\_NOT\_IC\%_{i,t}$ captures deficiencies unrelated to internal controls. The lack of significance on this coefficient suggests that fees do not increase in response to other types of deficiencies. In addition, we find a significant positive coefficient on $MISSTATE_{i,t}$ for the full sample and the sub-sample of Big Four auditors (t-stats. = 2.77 and 2.75), but not for the smaller sample of non-Big Four auditors. This is consistent with Big Four auditors charging higher audit fees to companies with lower financial reporting quality and with such companies being more likely to subsequently restate their accounts.

4.9 REMEDIATION AND INTERIM FINANCIAL REPORTING

If auditors remediate the audit deficiencies identified by the PCAOB inspectors, they may also be more likely to identify misstatements in interim financial reports. If so, managers may remediate the weakness that caused the interim misstatement, and if the remediation occurs before the fiscal year-end, the auditor would then issue a clean internal control opinion. Thus, our treatment variable ($DEF\_IC\%_{i,t}$) may lead to a reduction in adverse opinions among clients who restate their interim financial statements before the year-end. This suggests another possible channel through which the PCAOB's increased inspection

[26] We also rerun the audit fee model after including $ICOP_{i,t}$ and $ICOP_{i,t} \times DEF\_IC\%_{i,t}$, and find (un-tabled) that the interaction term is insignificant at conventional levels. This is consistent with $DEF\_IC\%_{i,t}$ triggering costly remediation even on engagements that do not result in the issuance of an adverse audit opinion.

efforts might improve the quality of internal control audits. We note, however, that this effect would reduce our ability to detect an increase in adverse opinions among audit firms with relatively high inspection deficiency rates.

We investigate this possibility by creating an indicator variable ($REMED_{i,t}$) that equals one if company *i* both (1) restates its interim financial statements prior to the auditor's issuance of its internal control opinion in year *t*, and (2) does not subsequently restate its annual audited financial statements for year *t*; $REMED_{i,t}$ equals zero otherwise. The first requirement assures that the client had a material weakness in internal controls during an interim period, and the second requirement is consistent with successful remediation prior to the fiscal year-end.[27] We then repeat our analysis in Table 4 after including the interaction term, $REMED_{i,t} \times DEF\_IC\%_{i,t}$. The results (not tabled) find that the coefficient on the interaction term is positive but insignificant (z-stat. = 0.81).[28] Thus, our results do not suggest that PCAOB inspections cause companies to remediate the material weaknesses that cause misstatements of their interim financial reports. We caution, however, that the absence of a subsequent restatement is a crude proxy for remediation, limiting the strength of the inferences we can draw from this analysis.

5. Sensitivity Tests

As discussed in Section II of the Internet Appendix, we find that our primary results are robust to the following:

1. Controlling for company fixed effects and random effects[29];
2. Using changes in deficiency rates instead of levels as our treatment variable;
3. Replacing $DEF\_NOT\_IC\%_{i,t}$ with a variable capturing any type of deficiency;

[27] Imdieke [2016] finds that 18.5% of reported remediations are subsequently revealed to have been unsuccessful.

[28] The coefficient on the main effect of $REMED_{i,t}$ is significantly positive, suggesting that internal control weaknesses associated with interim financial reporting misstatements are not fully remediated prior to year-end.

[29] After including company fixed effects and random effects, we find that the magnitude of the coefficient on *DEF_IC%* is equal to or larger than the magnitude of the coefficients on *DEF_IC%* reported in Tables 4 and 7.

4. Measuring $DEF\_IC\%_{i,t}$ as the unscaled number of deficiencies, and using this variable to test the entire period for which we have inspection reports (2005-2013);
5. Constructing the post-inspection windows using the inspection completion date instead of the inspection report date;
6. Redefining $DEF\_NOT\_IC\%_{i,t}$ to exclude deficiencies related to the inappropriate evaluation of the materiality of identified material weaknesses.
7. Dropping clients that entered or exited the sample.

6. Summary and conclusion

In recent years, the PCAOB and SEC have expressed concerns about auditors failing to detect and report material internal control weaknesses. In an effort to improve the quality of internal control audits, the PCAOB focused its inspections on whether audit firms obtain sufficient evidence to support their internal control opinions. Our study examines whether the PCAOB's efforts were successful in improving the quality of internal control audits.

As hypothesized, we find that PCAOB inspection reports disclosing higher rates of deficiencies in internal control audits are followed by an increase in auditors' issuance of adverse opinions. In addition, the reported deficiencies prompt auditors to issue more adverse opinions to companies that genuinely warrant them; i.e., companies with concurrent material misstatements. Finally, we find that inspection reports with higher deficiency rates lead to increased audit fees. Together, our findings suggest that PCAOB inspections motivate audit firms to remediate the deficiencies in their internal control audits, leading to improved quality during the post-inspection period, albeit at a higher cost to audit clients.

We caution, however, that there are some caveats in interpreting our findings. One is that we are unable to conclude whether the observed remediation is socially optimal. The improvement in internal control audits is accompanied by an increase in audit fees as well as an increase in inspection costs, and we cannot evaluate whether the benefits justify the

additional costs. Another caveat is that we compare audit firms with high deficiency rates relative to those with low deficiency rates. However, audit firms with low deficiency rates may also derive remediation benefits from PCAOB inspections. Without comparisons to uninspected audit firms (which is not feasible, since every US public company audit firm is inspected), we are unable to measure the benefits of inspections to audit firms with low deficiency rates. Finally, it remains an open question whether the other types of deficiencies reported by PCAOB inspectors (primarily deficiencies in substantive testing and analytical procedures) also lead to subsequent improvements in audit quality. It is challenging to measure improvements in substantive testing and analytical procedures using archival data, so we leave this to future research.

REFERENCES

AOBDIA, D. 'The Impact of the PCAOB Individual Engagement Inspection Process – Preliminary Evidence.' Unpublished paper, Northwestern University of Chicago, 2016.

ASHBAUGH-SKAIFE, H., D. W. COLLINS, and W. R. KINNEY. 'The Discovery and Reporting of Internal Control Deficiencies Prior to SOX-mandated Audits.' *Journal of Accounting and Economics* 44 (2007): 166-192.

CARCELLO, J., C. HOLLINGSWORTH, and S. MASTROLIA. 'The Effect of PCAOB Inspections on Big 4 Audit Quality.' Research in Accounting Regulation, 23 (2011): 85–96.

CARPENTER, C., DOBKIN, C. 'The Minimum Legal Drinking Age and Public Health.' Journal of Economic Perspectives 25 (2011): 133–56.

COHN, M. 'PCAOB Sanctions 5 Auditors for Violations.' Accounting Today April 7, 2015a.

COHN, M. 'PCAOB Sanctions Firms for Broker-Dealer Audits.' Accounting Today July 9, 2015b.

COHN, M. 'PCAOB Sanctions 7 Audit Firms and Individuals.' Accounting Today July 23, 2015c.

DEFOND, M. and J. ZHANG.. 'A Review of Archival Auditing Research.' Journal of Accounting and Economics 58 (2014): 275-326.

DOOGAR, R., P. SIVADASAN, and I. SOLOMON. 'The Regulation of Public Company Auditing: Evidence from the Transition to AS5.' Journal of Accounting Research 48 (2010): 795–814.

DOWLING, C., W. R. KNECHEL, and R. MORONEY. 'Public Oversight of Audit Firms: The Slippery-Slope of Enforcing Regulation.' Unpublished paper, University of Melbourne and University of Florida, 2015. Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2678828

DOYLE, J., W. GE, and S. MCVAY. 'Determinants of Weaknesses in Internal Control over Financial Reporting.' Journal of Accounting and Economics, 44 (2007): 193-223.

DRAKE, K. D., N. C. GOLDMAN, and S. J. LUSCH. 'Do Income Tax Related Deficiencies in Publicly Disclosed PCAOB Part II Reports Influence Audit Client Financial Reporting of Income Tax Accounts?' The Accounting Review (2016), forthcoming.

ETTREDGE, M. E., J. HEINTZ, C. LI, and S. SCHOLZ. 'Auditor Realignments Accompanying Implementation of SOX 404 ICFR Reporting Requirements.' Accounting Horizons 25(1) (2011): 17- 39.

FRANZEL, J. 'Effective Audits of Internal Control in the Current "Perfect Storm". Speech given by PCAOB Board member to the Institute of Internal Auditors.' 2014 General Audit Management Conference, March 26, 2014.

FUNG, S., K. RAMAN, and X. ZHU. 'Does the PCAOB's International Inspection Program Provide Spillover Audit Quality Benefits for Investors Abroad?' Unpublished paper, The Hong Kong Polytechnic University, University of Texas at San Antonio, and City University of Hong Kong, 2014. Available at http://www.af.polyu.edu.hk/files/jiar2014/cc006%20PB20140510_JIAR_final.pdf

GIPPER, B., C. LEUZ, and M. MAFFETT. 'Public Audit Oversight and Reporting Credibility: Evidence from the PCAOB Inspection Regime.' Unpublished paper, University of Chicago, 2015. Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2641211

GLOVER, J., D. PRAWITT, and M. TAYLOR. 'Audit Standard Setting and Inspection for US Public Companies: A Critical Assessment and Recommendations for Fundamental Change.' Accounting Horizons 23 (2009): 221-237.

GLOVER, J., M. TAYLOR, and Y. WU. 'Mind the Gap: Factors Contributing to Reported Deficiencies in Auditing Complex Estimates Beyond Auditor Performance,' Unpublished paper, Byrigham Young University, Case Western Reserve University, and Texas Tech University, 2015. Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2504521

GRAMLING, A., J. KRISHNAN, and Y. ZHANG. 'Are PCAOB-identified Audit Deficiencies Associated with a Change in Reporting Decisions of Triennially Inspected Audit Firms?' AUDITING: A Journal of Practice & Theory 30 (3) (2011): 58-79.

IMDIEKE, A. 'Unsuccessful Remediation of Material Weaknesses: The Role of Incentives and Remediation Actions.' Unpublished paper, Michigan State University, 2016.

JOHNSON, L., M. B. KEUNE, and J. WINCHEL. 'Auditors' Perceptions of the PCAOB Process.' Unpublished paper, University of Tennessee, University of Dayton, and University of Virginia, 2015. Available at http://www.darden.virginia.edu/uploadedFiles/Darden_Web/Content/Faculty_Research/Seminars_and_Conferences/JenniferWinchel.pdf

KRISHNAN, J., J. KRISHNAN, and H. SONG. 'PCAOB International Inspections and Audit Quality.' Unpublished paper, Temple University and the University of Akron, 2014. Available at http://www.audsymp.dept.ku.edu/wp-content/uploads/2014/05/Saturday-Paper-1-by-Krishnan-Krishnan-Song.pdf

LAMOREAUX, P. 'Does PCAOB Exposure Affect Auditor Reporting Decisions?' Journal of Accounting and Economics (2016), forthcoming.

LENNOX, C., and J. PITTMAN. 'Auditing the Auditors: Evidence on the Recent Reforms to the External Monitoring of Audit Firms.' Journal of Accounting and Economics 49 (2010): 84-103.

NEWTON, N., J. PERSELLIN, D. WANG, and M. WILKINS. 'Internal Control Opinion Shopping and Audit Market Competition.' The Accounting Review 91 (2016): 603-623.

PCAOB. Speech by Board Member Daniel L. Goelzer at The Colorado Society of CPAs 2005 SEC Conference,. December 12, 2005.

PCAOB. 'Statement Regarding the PCAOB's Approach to Inspections of Internal Control Audits in the 2006 Inspection Cycle.' PCAOB Release No. 104-2006-105, May 1, 2006.

PCAOB. 'An Audit of Internal Control Over Financial Reporting That Is Integrated with An Audit of Financial Statements.' PCAOB Release No. 2007-005A, November 15, 2007.

PCAOB. 'Report on the First-year Implementation of Auditing Standard No. 5, An Audit of Internal Control over Financial Reporting That Is Integrated with An Audit of Financial Statements.' PCAOB Release No. 2009-006, September 29, 2009.

PCAOB. 'Information for Audit Committees about the PCAOB Inspection Process.' PCAOB Release No. 2012-003, August 1, 2012a.

PCAOB. 'Observations from 2010 Inspections of Domestic Annually Inspected Firms Regarding Deficiencies in Audits of Internal Control Over Financial Reporting.' PCAOB Release No. 2012-006, December 10, 2012b.

PCAOB. 'Considerations for Audits of Internal Control Over Financial Reporting.' Staff Audit Practice Alert No. 11, October 24, 2013.

PCAOB. '2014 Annual Report.' PCAOB, Washington, DC, 2015a.

PCAOB. 'Importance of Audits of Internal Controls.' Speech by Helen A. Munter, Director, Division of Registration and Inspections. PCAOB, Washington, DC. September 9, 2015b.

RICE, S. C., and D. P. WEBER. 'How Effective is Internal Control Reporting Under SOX 404? Determinants of the (Non-) disclosure of Existing Material Weaknesses.' Journal of Accounting Research, 50 (2012): 811-843.

SECURITIES AND EXCHANGE COMMISSION (SEC). 'Remarks Before the 2009 AICPA National Conference on Current SEC and PCAOB Developments.' By Doug Besch, Washington D.C., December 7, 2009

TYSAIC, K. 'Audit Regulators See Positive Signs.' Journal of Accountancy, August 31, 2014.

TABLE 1

Audit firms' internal control reports and the deficiencies in internal control audits found by

Panel A: Big Four audit firms

Adverse internal control reports (%)		PCAOB inspection reports	
Full	Misstatements	Mean no. of audits found to	Mean no. of audits

Year	sample	sub-sample	have internal control deficiencies	examined by inspectors
	(1)	(2)	(3)	(4)
2005	10.0%	19.9%	4.00	n.a.
2006	7.4%	16.8%	0.75	n.a.
2007	6.3%	13.8%	1.00	n.a.
2008	3.8%	9.0%	0.00	n.a.
2009	2.6%	4.9%	0.75	n.a.
2010	1.9%	3.8%	2.50	66.75
2011	2.5%	5.4%	9.00	60.50
2012	2.8%	6.1%	12.75	54.75
2013	3.6%	9.0%	16.50	50.50

Panel B: Annually-inspected non-Big Four audit firms

	Adverse internal control reports (%)			PCAOB inspection reports
Year	Full sample	Misstatements sub-sample	Mean no. of audits found to have internal control deficiencies	Mean no. of audits examined by inspectors
	(1)	(2)	(3)	(4)
2005	10.8%	22.1%	2.50	n.a.
2006	7.7%	18.2%	2.00	n.a.
2007	6.5%	13.4%	0.50	n.a.
2008	4.1%	9.0%	0.50	n.a.
2009	2.9%	5.5%	0.25	n.a.

TABLE 1 (cont.)
Audit firms' internal control reports and the deficiencies in internal control audits found by

Panel B: Annually-inspected non-Big Four audit firms (cont.)

	Adverse internal control reports (%)			PCAOB inspection reports
Year	Full sample	Misstatements sub-sample	Mean no. of audits found to have internal control deficiencies	Mean no. of audits examined by inspectors
	(1)	(2)	(3)	(4)
2010	2.3%	5.8%	1.25	26.00
2011	2.8%	6.6%	3.50	26.00
2012	2.9%	6.6%	4.50	21.75
2013	3.7%	8.5%	7.50	20.50

Panel C: Triennially-inspected non-Big Four audit firms

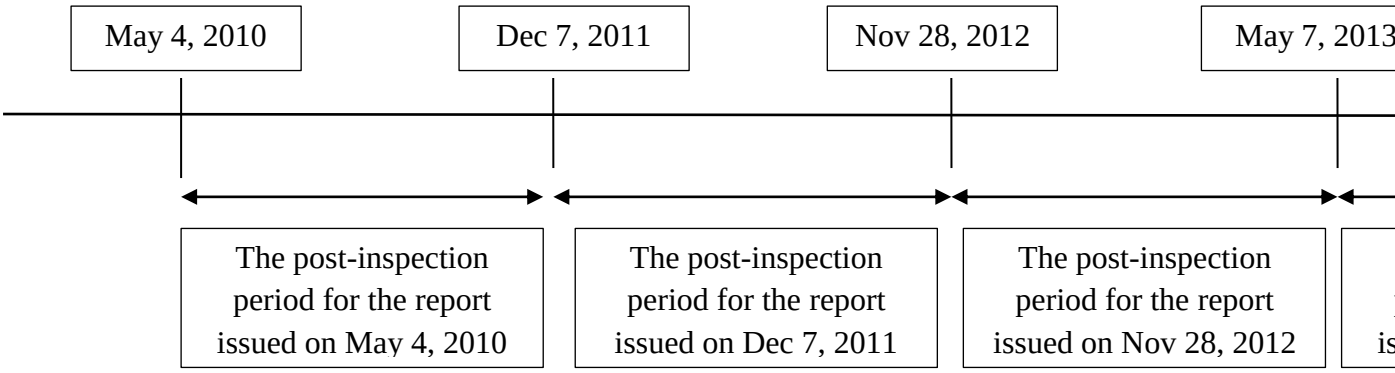
	Adverse internal control reports (%)			PCAOB inspection reports
Year	Full sample	Misstatements sub-sample	Mean no. of audits found to have internal control deficiencies	Mean no. of audits examined by inspectors
	(1)	(2)	(3)	(4)
2005	14.8%	26.7%	0.44	5.36

2006	16.9%	24.6%	0.10	3.25
2007	14.3%	24.4%	0.13	5.46
2008	13.1%	23.1%	0.00	4.24
2009	7.1%	14.3%	0.00	2.63
2010	8.2%	17.9%	0.02	3.69
2011	12.1%	14.3%	0.07	3.42
2012	8.2%	23.8%	0.22	3.59
2013	6.1%	25.0%	0.27	3.29

Fig. 1
The post-inspection windows.

(a) Annually inspected auditors.

For example, inspection reports were issued to Deloitte & Touche on May 4, 2010, Dec 7, 2011, Nov 28, 2012, May 7, 2013, and May 6, 2014. Its four post-inspection windows are measured as follows:



(b) Triennially inspected auditors.

For example, inspection reports were issued to Brown, Edwards and Company on Sept 30, 2008, Aug 3, 2011, and Feb 27, 2014. Its two post-inspection windows are measured as follows:

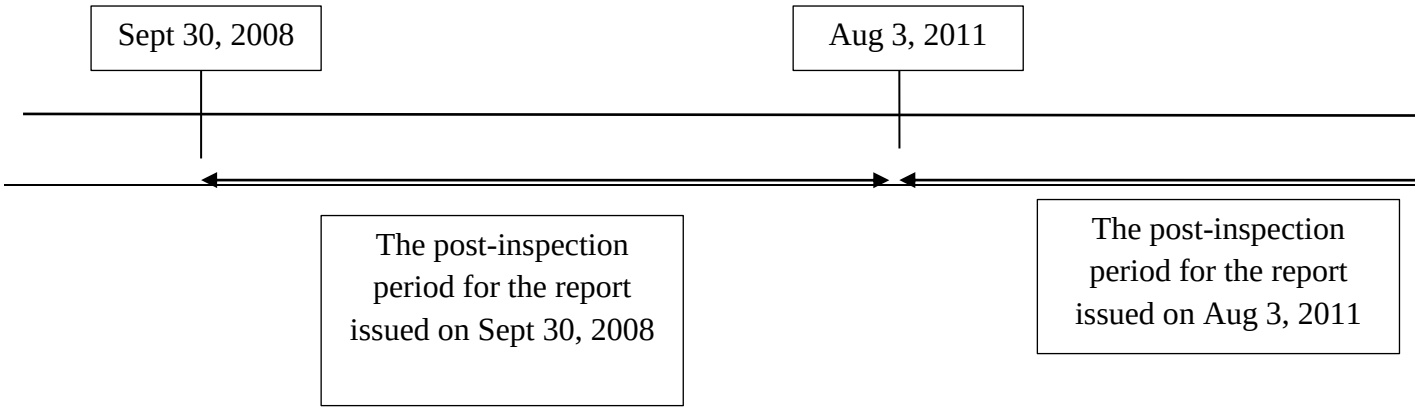


TABLE 2
Auditors' internal control reports and PCAOB inspection reports.
The sample of internal control reports comprises companies with year-ends in the perio
The sample of PCAOB inspection reports comprises the post-inspection windows for this pe

	Auditors' internal control reports		PCAOB in
	No. of reports	Adverse (%)	No. of post-inspection windows (see Fig. 1)
8 Annually inspected auditors:			
Deloitte & Touche	2,635	1.90%	4
Ernst & Young	3,560	2.75%	4
KPMG	2,594	2.58%	4
PricewaterhouseCoopers	2,989	3.04%	4
BDO	388	4.38%	4
Crowe Horwath	156	1.92%	4
Grant Thornton	598	5.35%	4
McGladrey	138	5.07%	4
	13,058		32
94 Triennially inspected auditors	875	5.03%	310
Total	13,933		Total 342

TABLE 3
Mean values of the independent variables.

	Adverse internal control reports issued during the post-inspection window ($ICOP_{i,t}$ = 1)	Clean internal control reports issued during the post-inspection window ($ICOP_{i,t}$ = 0)	Adverse vs. clean (t-stat.)
$DEF\_IC\%_{i,t}$	0.1948	0.1683	3.98***
$DEF\_NOT\_IC\%_{i,t}$	0.1289	0.1211	1.62
$ICOP_{i,t-1}$	0.2861	0.0191	34.27***
$MISSTATE_{i,t}$	0.2323	0.0909	9.64***
$RESIGN_{i,t}$	0.0367	0.0035	9.87***
$Ln(AF)_{i,t}$	14.1613	14.1128	0.80
$Ln(NAS)_{i,t}$	10.2511	11.0198	-3.75***
$SIZE_{i,t}$	12.4372	13.6843	-8.34***
$LOSS_{i,t}$	0.4670	0.2192	11.86***
$SEGMENTS_{i,t}$	4.0513	4.2556	-0.91
$FOREIGN_{i,t}$	0.3887	0.3465	1.77*
$INVENTORY_{i,t}$	0.0826	0.0714	2.03**
$GROWTH_{i,t}$	0.0536	0.0733	1.30
$XTFIN_{i,t}$	0.1589	0.1388	1.41
$M\&A_{i,t}$	0.1883	0.1735	0.77
$RESTRUCTURE_{i,t}$	0.3056	0.2810	1.26
Obs.	409	13,524	

***, **, * denote statistically significant at the 1%, 5%, 10% levels, respectively (two-tailed tests)

See Appendix for variable definitions.

TABLE 4
PCAOB inspection deficiencies and auditors' subsequent internal control reports.

$ICOP_{i,t} = \alpha_1\ DEF\_IC\%_{i,t} + \alpha_2\ DEF\_NOT\_IC\%_{i,t} + CONTROLS$
$+ Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u$

Z-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company.

	All auditors	Big Four Auditors	Non-Big Four Auditors
	(1)	(2)	(3)
$DEF\_IC\%_{i,t}$	3.18***	5.03***	2.72***
	(5.70)	(4.47)	(3.28)
$DEF\_NOT\_IC\%_{i,t}$	0.24	1.00	0.84
	(0.42)	(0.81)	(1.31)
$ICOP_{i,t-1}$	2.65***	2.83***	2.14***
	(15.87)	(14.29)	(7.61)
$MISSTATE_{i,t}$	1.12***	1.09***	1.31***
	(8.31)	(6.97)	(4.57)
$RESIGN_{i,t}$	1.75***	2.32***	1.66***
	(4.70)	(4.03)	(4.10)
$Ln(AF)_{i,t}$	0.25***	0.27***	0.45***
	(4.23)	(3.71)	(2.63)
$Ln(NAS)_{i,t}$	-0.03**	-0.04**	-0.03
	(-2.52)	(-2.43)	(-1.06)
$SIZE_{i,t}$	-0.09***	-0.08***	-0.11***
	(-8.29)	(-7.50)	(-3.02)
$LOSS_{i,t}$	0.86***	0.81***	1.00***
	(7.38)	(6.02)	(4.40)
$SEGMENTS_{i,t}$	0.01	0.01	-0.02
	(0.32)	(0.63)	(-0.72)
$FOREIGN_{i,t}$	0.12	0.28**	-0.73***
	(1.06)	(2.11)	(-2.80)
$INVENTORY_{i,t}$	0.90**	0.93*	1.08
	(2.18)	(1.79)	(1.43)
$GROWTH_{i,t}$	0.11	-0.04	0.57*
	(0.71)	(-0.20)	(1.77)
$XTFIN_{i,t}$	-0.05	0.15	-1.10
	(-0.19)	(0.60)	(-1.62)
$M\&A_{i,t}$	0.17	-0.01	0.81**
	(1.13)	(-0.06)	(2.51)
$RESTRUCTURE_{i,t}$	-0.14	-0.14	-0.11
	(-1.02)	(-0.95)	(-0.34)
Obs.	13,933	11,778	2,155
Pseudo R^2	17.7%	17.3%	22.1%

TABLE 4 (cont.)
PCAOB inspection deficiencies and auditors' subsequent internal control reports.

***, **, * denote statistically significant at the 1%, 5%, 10% levels, respectively (two-tailed tests).

See Appendix for variable definitions.

TABLE 5
Types of internal control audit deficiencies identified by PCAOB inspectors

Panel A: Deficiencies arising from:
1) inadequate testing of internal controls (DEF_IC_TEST%$_{i,t}$)
2) inadequate evaluation of materiality of identified weaknesses (DEF_IC_MATERIAL%$_{i,t}$)

	All auditors	Annually inspected auditors	Triennially inspected auditors	Big Four auditors	Non-Big Four auditors
DEF_IC_TEST%$_{i,t}$	0.1690	0.1780	0.0367	0.1794	0.1125
DEF_IC_MATERIAL%$_{i,t}$	0.0182	0.0194	0.0000	0.0204	0.0063

Panel B: Three sub-categories of an auditor's inadequate testing of internal controls:
1) inadequate testing of controls relating to specific accounts (DEF_IC_TEST_AC%$_{i,t}$)
2) inadequate testing of controls relating to IT systems (DEF_IC_TEST_IT%$_{i,t}$)
3) inadequate testing of controls due to over-reliance on the work of others (DEF_IC_TEST_OTHERS%)

	All auditors	Annually inspected auditors	Triennially inspected auditors	Big Four auditors	Non-Big Four auditors
DEF_IC_TEST_AC%$_{i,t}$	0.1580	0.1664	0.0324	0.1671	0.1083
DEF_IC_TEST_IT%$_{i,t}$	0.0288	0.0307	0.0000	0.0307	0.0184
DEF_IC_TEST_OTHERS%$_{i,t}$	0.0383	0.0403	0.0074	0.0396	0.0312

Panel C: Regression results
Z-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company. We use the same control variables (*CONTROLS*) as in Table 4 but results for the control variables are untabulated. The models are estimated for the full sample because *DEF_IC_MATERIAL%$_{i,t}$* equals zero for all the triennially inspected auditors (see Panel A above).

DEF_IC_TEST%$_{i,t}$	2.86***	
	(4.88)	
DEF_IC_MATERIAL%$_{i,t}$	7.13***	6.72**
	(3.02)	(2.41)
DEF_IC_TEST_AC%$_{i,t}$		2.72***
		(4.62)
DEF_IC_TEST_IT%$_{i,t}$		1.89
		(0.48)
DEF_IC_TEST_OTHERS%$_{i,t}$		1.52
		(0.67)
CONTROLS?	YES	YES
Obs.	13,933	13,933

TABLE 5 (cont.)
Types of internal control audit deficiencies identified by PCAOB inspectors.

***, ** denote statistically significant at the 1%, 5% levels, respectively (two-tailed tests).

See Appendix for variable definitions.

TABLE 6
PCAOB inspection deficiencies and auditors' subsequent internal control reports for companies whose financial statements are materially misstated when the auditor issues the internal control report.

$$ICOP_{i,t} = \alpha_1\, DEF\_IC\%_{i,t} + \alpha_2\, DEF\_IC\%_{i,t} \times MISSTATE_{i,t} + \alpha_3\, MISSTATE_{i,t} + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u$$

Z-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company. We use the same control variables (*CONTROLS*) as in Table 4 but results for the control variables are untabulated.

	All auditors	Big Four auditors	Non-Big Four auditors
$DEF\_IC\%_{i,t}$	3.23***	4.97***	2.87***
	(5.83)	(4.40)	(3.54)
$DEF\_IC\%_{i,t} \times MISSTATE_{i,t}$	-0.47	0.37	-2.81
	(-0.46)	(0.30)	(-1.40)
$MISSTATE_{i,t}$	1.21***	1.01***	1.56***
	(5.50)	(3.51)	(4.56)
CONTROLS?	YES	YES	YES
$\alpha_1 + \alpha_2$	2.76	5.34	0.06
Chi^2 test of $\alpha_1 + \alpha_2$	6.10**	11.20***	0.00
Obs.	13,933	11,778	2,155
Pseudo R^2	17.7%	17.3%	21.7%

***, ** denote statistically significant at the 1%, 5% levels, respectively (two-tailed tests).

See Appendix for variable definitions.

TABLE 7
Adverse internal control opinions as timely and informative indicators of the future risk of an accounting restatement.

$$RESTATE_{i,t+1} = \alpha_1 ICOP_{i.t} + \alpha_2 DEF\_IC\%_{i,t} + \alpha_3 ICOP_{i.t} \times DEF\_IC\%_{i,t} + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u$$

Z-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company. We use the same control variables (*CONTROLS*) as in Table 4 but results for the control variables are untabulated.

$ICOP_{i,t}$	1.33***	1.52***
	(9.37)	(6.60)
$ICOP_{i,t} \times DEF\_IC\%_{i,t}$		-0.95
		(-1.00)
$DEF\_IC\%_{i,t}$	-0.26	-0.16
	(-0.55)	(-0.34)
CONTROLS?	YES	YES
Obs.	13,933	13,933
Pseudo R^2	4.8%	4.8%

***, ** denote statistically significant at the 1%, 5% levels, respectively (two-tailed tests).

See Appendix for variable definitions.

TABLE 8
PCAOB inspections and auditors' internal control reports issued in the period before the inspections begin.

$PRE\_ICOP_{i,t} = \beta_1 DEF\_IC\%_{i,t} + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u$

Z-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company. We use the same control variables (*CONTROLS*) as in Table 4 but results for the control variables are untabulated.

	All auditors	Big Four auditors	Non-Big Four auditors
$DEF\_IC\%_{i,t}$	-0.17	-1.30	0.37
	(-0.29)	(-1.51)	(0.48)
CONTROLS?	YES	YES	YES
Obs.	16,154	13,475	2,679

***, **, * denote statistically significant at the 1%, 5%, 10% levels, respectively (two-tailed tests).

See Appendix for variable definitions.

TABLE 9
PCAOB inspection results and subsequent audit fees.

$Ln(AF)_{i,t} = \alpha_1\ DEF\_IC\%_{i,t} + \alpha_2\ DEF\_NOT\_IC\%_{i,t}\ + CONTROLS$
$+ Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u$

T-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company.

	All auditors	Big Four auditors	Non-Big Four auditors
$DEF\_IC\%_{i,t}$	0.09***	0.10***	0.09*
	(3.13)	(2.89)	(1.94)
$DEF\_NOT\_IC\%_{i,t}$	0.01	0.04	-0.01
	(0.27)	(0.96)	(-0.22)
$Ln(AF)_{I,t-1}$	0.96***	0.96***	0.91***
	(340.43)	(340.22)	(74.42)
$MISSTATE_{i,t}$	0.02***	0.02***	0.01
	(2.77)	(2.75)	(0.63)
$RESIGN_{i,t}$	-0.01	0.17	-0.14
	(-0.13)	(1.36)	(-1.35)
$SIZE_{i,t}$	0.01***	0.01***	0.01**
	(6.55)	(5.88)	(2.46)
$Ln(NAS)_{i,t}$	0.01***	0.01***	0.01***
	(11.12)	(10.39)	(2.86)
$LOSS_{i,t}$	0.01	0.00	0.02
	(0.56)	(0.06)	(1.21)
$SEGMENTS_{i,t}$	0.01	0.01	0.01
	(0.99)	(0.66)	(1.01)
$FOREIGN_{i,t}$	0.01	-0.01	0.04**
	(0.28)	(-0.48)	(2.33)
$INVENTORY_{i,t}$	-0.01	-0.01	-0.01
	(-0.67)	(-0.43)	(-0.08)
$GROWTH_{i,t}$	0.11***	0.12***	0.08***
	(8.68)	(8.66)	(3.38)
$XTFIN_{i,t}$	0.04***	0.04***	0.03**
	(5.41)	(4.70)	(2.34)
$M\&A_{i,t}$	0.08***	0.08***	0.13***
	(14.73)	(13.09)	(7.75)
$RESTRUCTURE_{i,t}$	-0.02***	-0.02***	-0.05***
	(-4.35)	(-3.74)	(-2.84)
Obs.	13,873	11,731	2,142
R^2	96.3%	96.0%	90.7%

***, **, * denote statistically significant at the 1%, 5%, 10% levels, respectively (two-tailed tests).

See Appendix for variable definitions.